

Remarks

Claim 3 has been amended. Claims 1, 3-17, and 19-20 are pending in this application. Claims 13-16 have been withdrawn from consideration.

The Examiner objected to the drawings under 35 C.F.R. §1.84(p)(5) because  $\theta_1$  of Fig. 5 is not mentioned in the description. Applicant traverses the Examiner's objection because  $\theta_1$  of Fig. 5 is mentioned in the description in paragraph 0051, lines 6 and 9.

The Examiner objected to the drawings under 35 C.F.R. §1.84(p)(5) allegedly because  $\theta_2$  of Fig. 6B is not mentioned in the description. Applicant traverses the Examiner's objection because  $\theta_2$  of Fig. 6B is mentioned in the description in paragraph 0052, lines 5, 6, 9, 11 and 12 and in paragraph 0055, lines 2, 9 and 11.

In response to the request for a substitute specification pursuant to 37 C.F.R. §1.125(a), mailed September 8, 2000, Applicants provide a copy of the specification, as originally filed, in Appendix A.

The Examiner rejected Claim 3 under 35 U.S.C. 112, second paragraph, as allegedly depending from a canceled claim. Accordingly, Applicants have amended Claim 3, such that it depends from Claim 1.

The Examiner rejected Claims 1, 3, 5-7, 9-12, 17, and 19-20 under 35 U.S.C. 103(a) as allegedly being unpatentable over Mitani *et al.* ("JP '780") in view of Deacon *et al.*, US Patent 5,792,269 ("U.S. '269").

The Examiner rejected Claim 4 under 35 U.S.C. 103(a) as being allegedly unpatentable over Mitani *et al.* ("JP '780") and Deacon *et al.*, US Patent 5,792,269 ("U.S. '269") as applied to Claims 1, 3, 5-7, 9-12, 17, and 19-20 above, and further in view of Plavidal *et al.*, US Patent 5,718,795 ("U.S. '795").

The Examiner rejected Claim 8 under 35 U.S.C. 103(a) as being allegedly unpatentable over Mitani *et al.* ("JP '780") and Deacon *et al.*, US Patent 5,792,269 ("U.S. '269") as applied to Claims 1, 3, 5-7, 9-12, 17, and 19-20 above, and further in view of Hasegawa *et al.*, US Patent 5,837,093 ("U.S. '093").

Applicants respectfully traverse the Examiner's rejections under 35 U.S.C. 112, second paragraph and 103(a) with the following discussion.

35 U.S.C. 112, second paragraph

The Examiner rejected Claim 3 under 35 U.S.C. 112, second paragraph, as allegedly depending from a canceled claim. Accordingly, Applicants have amended Claim 3, such that it depends from Claim 1.

35 U.S.C. 103(a)

The Examiner rejected Claims 1, 3, 5-7, 9-12, 17, and 19-20 under 35 U.S.C. 103(a) as allegedly being unpatentable over Mitani *et al.* ("JP '780") and Deacon *et al.*, US Patent 5,792,269 ("U.S. '269"). Applicants respectfully contend the Examiner's rejection of Claims 1, 3, 5-7, 9-12, 17, and 19-20 is improper because there is no motivation to combine JP '780 and U.S. '269. Firstly, the Examiner has not identified any teaching or suggestion in the prior art for combining planar coverage and step coverage in one apparatus. Secondly, the Examiner has not identified teaching or suggestion in the prior art indicating that it would be more economical to combine planar coverage and step coverage in one apparatus. Thirdly, the Examiner has not presented evidence showing that modifying Mitani *et al.* by using Deacon's angled jets of fluid would not destroy Mitani's excellent +/- 3% planar coverage.

Regarding Applicant's first argument, the Examiner states "[t]he motivation for angling the channels of Mitani *et al.* is to improve **step coverage** as taught by Deacon *et al.*" (emphasis added). The Examiner acknowledges that Mitani *et al.* do not teach structures having **sidewalls** as do Deacon *et al.* See the Final Office Action, page 7, paragraph 12 (stating "[t]he apparatus of Mitani *et al.* is limited to only coating flat (planar) wafers."). Applicants respectfully contend that the Examiner has created a reason for the combination, i.e., improving the channels of Mitani *et al.* by improving the step coverage as taught by Deacon *et al.*, that the Examiner has not supported by the cited prior art.

Regarding Applicant's second argument, the Examiner's created reason that Applicants contend is not supported in the Examiner's cited prior art includes that one skilled in the art would be **economically** motivated "to angle the holes of Mitani *et al.* as taught by Deacon *et al.*, thus enabling the apparatus of Mitani *et al.* to perform both planar coating and step coating methods" (emphasis added). The Final Office Action, page 8, paragraph 12. The Examiner

acknowledges that Mitani *et al.* do not teach structures having **sidewalls** as do Deacon *et al.*, and that Deacon *et al.* is directed to improving step coverage. Applicants respectfully submit step coverage is totally unnecessary in Mitani *et al.*, as the Examiner acknowledged Mitani *et al.* is directed to planar coatings.

Regarding Applicant's third argument, Applicants submit that Mitani *et al.* teach forming an "average film thickness of 3320 Å with an in-plane distribution of +/-3% or less formed on a 5-inch diameter Si wafer. Mitani *et al.*, page 6, Section 3, Working Example 1, paragraph 4, lines 6-8. Moreover, Applicants submit that Deacon *et al.* depict a **sidewall** in FIG. 1 as a metal line that is orthogonal to a planar surface such as depicted as 22a, 22b, and 22c. See U.S. '269, FIG. 1 and column 2, lines 57-67 and column 3, lines 1-9. In contrast, Mitani *et al.* teach a CVD apparatus that can form a good film having in-plane uniformity **within a range of pressures**" (emphasis added). Translation of JP '780, page 3, Section 3, Industrial Field of the Application. Nowhere does Deacon *et al.* teach forming a planar coating having an average film thickness of 3320 Å with a +/-3% or less in-plane distribution or a CVD apparatus that forms a good film having in-plane uniformity **within a range of pressures**. See Deacon *et al.* generally. The Examiner's combination of Mitani *et al.* and Deacon *et al.* is improper because the Examiner has not supplied a legally persuasive argument as to why a person of ordinary skill in the art would modify Mitani *et al.* by the teaching of Deacon *et al.* in relation to claims 1, 3, 5-7, 9-12, 17, and 19-20. In particular, established case law requires that the prior art must contain some suggestion or incentive that would have motivated a person of ordinary skill in the art to modify a reference or to combine references. See Karsten Mfg. Corp. V. Cleveland Gulf Co., 242 F.3d 1376, 58 U.S.P.Q.2d 1286, 1293 (Fed. Cir. 2001 ("In holding an invention obvious in view of a combination of references, there must be some suggestion, motivation, or teaching in the prior art that would have led a person of ordinary skill in the art to select the references and combine them in a way that would produce the claimed invention.")). See also In re Gordon, 733 F.2d 900, 902, 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984 ("The mere fact that the prior art could be so modified would not have made the motivation obvious unless the prior art suggested the desirability of the modification.")). Applicants maintain that the Examiner has not made any showing that the prior art suggests that angling the holes of Mitani *et al.*, as taught by Deacon *et al.*, is **economical**,

because the apparatus of Mitani *et al.* is able to perform both planar coating and step coating methods, as alleged by the Examiner. Thus, the Examiner has created a reason for the combination that the Examiner has not supported by the cited prior art. By not citing any suggestion or incentive in the prior art for improving sidewall step coverage in the invention of Mitani *et al.*, the Examiner has failed to establish a *prima facie* case of obviousness in relation to claims 1, 3, 5-7, 9-12, 17, and 19-20.

Applicants submit that Deacon *et al.* distinguishes itself from Mitani *et al.* because it discloses that the invention produces as much as a 35% improvement in **sidewall step coverage** as compared to prior art processes (see Fig. 1) where gas flow is directed perpendicular to the surface of the wafer, as in Mitani *et al.* See Deacon *et al.*, Column 3, lines 23 - 26. However, nowhere does Deacon *et al.* teach that the angled jets of fluid would not destroy Mitani's excellent +/- 3% planar coverage.

In light of the foregoing, Applicants contend that the Examiner's use of Deacon *et al.*, to modify Mitani *et al.* is improper, because Deacon *et al.* do not teach an **economical** advantage over Mitani *et al.* because Deacon *et al.* do not solve a problem that exists in Mitani *et al.*, as evidenced by the fact that Mitani *et al.* do not teach a need for **sidewall step coverage**, thus making Deacon's angled channels totally unnecessary to modify Mitani *et al.* Applicants respectfully submit Claims 1, 3, 5-7, 9-12, 17, and 19-20 are in condition for allowance under 35 U.S.C. 103(a) because the Examiner's rejection is based on an improper combination.

The Examiner rejected Claim 4 under 35 U.S.C. 103(a) as being allegedly unpatentable over Mitani *et al.* and Deacon *et al.*, as applied to Claims 1, 3, 5-7, 9-12, 17, and 19-20 above, and further in view of Plavidal *et al.*, US Patent 5,718,795 ("U.S. '795").

The Examiner rejected Claim 8 under 35 U.S.C. 103(a) as being allegedly unpatentable over Mitani *et al.* and Deacon *et al.*, as applied to Claims 1, 3, 5-7, 9-12, 17, and 19-20 above, and further in view of Hasegawa *et al.*, US Patent 5,837,093 ("U.S. '093").

Applicants respectfully contend the Examiner's rejections of Claims 4 and 8, depending from Claim 1, fail for the same reason asserted by Applicants to oppose the Examiner's rejection *supra* of Claim 1 under 35 U.S.C. 103(a) as allegedly being unpatentable over Mitani *et al.* and Deacon *et al.* The Examiner's argument that there is motivation to combine fails because

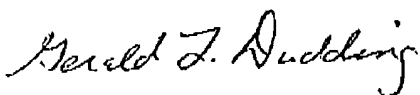
Deacon *et al.* teach does not teach an **economical** advantage over Mitani *et al.* because Deacon *et al.* does not solve a problem that exists in Mitani *et al.*, as evidenced by the fact that Mitani *et al.* teach improved **sidewall step coverage**, and because Deacon's angled channels are totally unnecessary in Mitani *et al.*

Given that all of the cited references, taken alone or in combination, fail to disclose each and every feature of Applicants' invention as recited in independent claims 1 and 17, and their respective dependent claims, Applicants respectfully submit that the above-referenced rejections under 35 U.S.C. §103(a) and 112, second paragraph have been overcome, and that claims 1, 3, 5-7, 9-12, 17, and 19-20 are in condition for allowance.

Conclusion

Accordingly, based on the preceding arguments, Applicants respectfully submit that claims 1, 3-12, 17, and 19-20, and the entire application, are in condition for allowance and therefore request favorable action. However, should the Examiner believe anything further is necessary in order to place the application in better condition for allowance, or if the Examiner believes that a telephone interview would be advantageous to resolve the issues presented, the Examiner is invited to contact the Applicants' undersigned representative at the telephone number listed below.

Respectfully submitted,



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